Unit 3: 3D Design and Printing

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **14 Days**
Status: **Published**

Brief Summary of Unit

Students will work through the Engineering Design Process as they develop a solution to a given problem with respect to criteria and specifications of the challenge given. In this unit, students will gain familiarity with a CAD program such as Tinkercad, where they will use their design and engineering skills to create a project. This project will then be used to create a 3D model using materials available or sent to a 3D printer within the classroom, enabling the student to print and create a product.

Revision Date: July 2026

L.SS.8.1	Demonstrate command of the system and structure of the English language when writing or speaking.
9.2.8.CAP.1	Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
L.KL.8.2	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.VL.8.3	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, including technical meanings, choosing flexibly from a range of strategies.
TECH.K-12.1.6.a	choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
TECH.K-12.1.6.b	create original works or responsibly repurpose or remix digital resources into new creations.
8.1.8.AP.6	Refine a solution that meets users' needs by incorporating feedback from team members and users.
8.2.8.ED.1	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
8.2.8.ED.5	Explain the need for optimization in a design process.
8.2.8.ED.6	Analyze how trade-offs can impact the design of a product.
8.2.8.ED.7	Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).
MS-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed

object, tool, or process such that an optimal design can be achieved.

Essential Questions/Enduring Understandings

Essential Questions

Why should engineers follow the Engineering Design Process?

How has the evolution of 3D printing affected our technological world?

How would the elimination of even one step in the Engineering Design Process affect the outcome?

In what ways will 3D printing impact our future as a society?

Enduring Understandings

Computer Aided Design (CAD) is a tool used by engineers and designers to create products that utilize computer technologies to enhance detail and precision.

Precise measurement is essential in product design.

Objectives

Students will know the vocabulary relevant to CAD and 3D printing.

Students will know how to create an STL file using CAD programs, such as Tinkercad.

Students will know how to share their work and add collaborators to projects.

Students will know how to send their STL file to the 3D printer.

Students will be skilled at using research skills to explore the areas of CAD and 3D printing.

Students will be skilled at designing objects with precision to the given specifications.

Students will be skilled at expressing their findings orally and through the creation of filed and 3D printed objects.

Learning Plan

Introduction Model Project: Students will select one project they have completed in technology class and make a scaled 3D model of it (the project can been from a previous year, and some ideas are bridges, rockets, dragsters, robots, etc.). If students have never taken technology class before, they can make a scaled model of the project they would have liked to complete the most.

3D Choice Project: Students will have the choice to complete an advanced challenge of creating a 3D item. Projects may include: Designing a Bubble Wand, Creating a Phone Stand, Designing a City Skyline, or other another approved project. The students may have the option to create their own design that utilizes CAD to produce a finished product from the laser cutter. Each project option will be completed with special attention to precise measurement. Students will select their own projects, have them approved by the teacher, create prototypes, meet with a classmate to gain constructive feedback, and then discuss the design with the teacher to determine if any improvements are needed.

Assessment

Formative:

Do Nows

Class discussions

Summative:

3D Choice Project

Google Forms

Benchmark:

Exit tickets

Model Project

Alternative:

Checklists

Verbal discussions

2nd Model Project vs 3D Choice Project

Materials

Chromebooks

Projector

YouTube

Tinkercad website

Google Docs

Google Forms

Google Slides

3D printers

3D filament

Models of previous technology class projects

Grid paper

Pencil

Ruler

Laser cutter

Integrated Accommodation and Modifications, Spec Ed Students, ELL, At-Risk, G&T, 504's

See attached document:

https://docs.google.com/spreadsheets/d/1pzkODxxGOSxESwthnE0jQW8hVfMaZ9ygEBg5QsKBcDA/edit?usp=sharing